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John T. O'Brien ~~and~~ Co.

10-20-84.

Patent Safety

Combination Scaffolds

Office ~~and~~ Factory,

1537 Thompson Street,

Philadelphia, Pa.



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JOHN T. O'BRIEN & CO.

PATENT SAFETY

COMBINATION SCAFFOLDS

Patented August 29, 1882; March 25, 1884; June 11, 1884,

OFFICE AND FACTORY,

No. 1537 THOMPSON STREET,

PHILADELPHIA.



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JOHN T. O'BRIEN & Co.
—PATENT—
SAFETY COMBINATION SCAFFOLDS.



Of all the adjuncts to a building in course of erection none is more necessary than a scaffold. Its services are required both outside and inside, from the building of the walls to the finishing of the rooms. When the work of building has progressed beyond the easy reach of the workman then is the scaffold required to bring him to a level with his work. It is as it were, another ground upon which he stands. It must therefore not only sustain him and his helpers, but must also support the weight of the materials he is using. It bears then life, limb and property, and this too in most cases at a great elevation from the ground. Safety should then be the cardinal virtue of a scaffold, but alas, how many are safe. How many are hastily put together with insufficient fastenings, and are mere traps for the destruction of life and limb.

The requirements of a perfect scaffold therefore are: that it shall be safe and convenient to give confidence and comfort to those employed upon it, strong in all its parts, to resist strains and accidental shocks to which it may be subjected, firm and stable to prevent dangerous, oscillating, tranverse or lateral motions, quickly erected and removed to save time, and economical in cost on account of its temporary use and character.

These properties may be condensed into two prime factors, which are, *first*—safety to life and limb of workmen, and *second*—the simplest mode of construction that will secure the highest efficiency with the least cost. This then is the common sense order and sequence which every builder of a scaffold should follow. But these elements, safety and economy, being as it were antagonistic, safety is often ignored and economy only considered; the

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result being too much economy and too little safety. The pernicious custom, so generally in vogue, of asking for bids when any piece of work is to be done must in a great measure take the blame for this state of affairs. No matter whether the work to be done be large or small, a score of estimates from as many builders is asked for before any contract is made, thus bringing many contractors and builders into competition, all equally desirous of getting the work. How can I reduce the cost to me to a minimum so that I can get this job? becomes the main question to be solved. This is done either by slighted workmanship, inferior materials or defective appliances necessary for the proper performance of the work.

Here is where the frail and cheap scaffold comes in, and the fact is suddenly made known to a wondering public by its fall, bringing death or broken limbs to innocent and unsuspecting workmen, who, trusting in the humanity of their employer, were jeopardizing their lives upon it.

From what has been said, it is plain to be seen, that the problems involved in perfect scaffold building demand certain necessary requisites, and that these are safety, convenience, strength, stability, economy, and rapidity of erection and removal. To combine these various requirements in one simple, neat and handsome design, has been the object of the Inventor, and he flatters himself that he has succeeded in this by the invention of his SAFETY COMBINATION SCAFFOLD which he now offers to the public, hoping that this result of his efforts to supply a long needed want, may meet the approval and endorsement of the building fraternity. The Scaffold has been in use in this city, Philadelphia, for some months, under the personal supervision of the inventor, and has triumphed in all tests as to the qualities claimed for it. In every case it has given entire satisfaction to architects, builders, and workmen who have used it, and has elicited the praise and admiration of all who have seen it in position.

EXPLANATION OF CUTS.

The following is a list of the various appliances (illustrated with cuts), which go to make up the scaffold, with a description of their application and uses.

Figure 1.—DOUBLE TIE, as applied to splicing uprights in scaffolds for bricklayers or masons, or connecting ledgers, which are halved at the ends, as shown in cut, figure 13.

Figure 2.—SINGLE, or DIAGONAL TIE, as applied for binding the ledger to the uprights. They are rights and lefts. They not only hold and bind the ledgers to the uprights, but act as a lateral or raking brace.

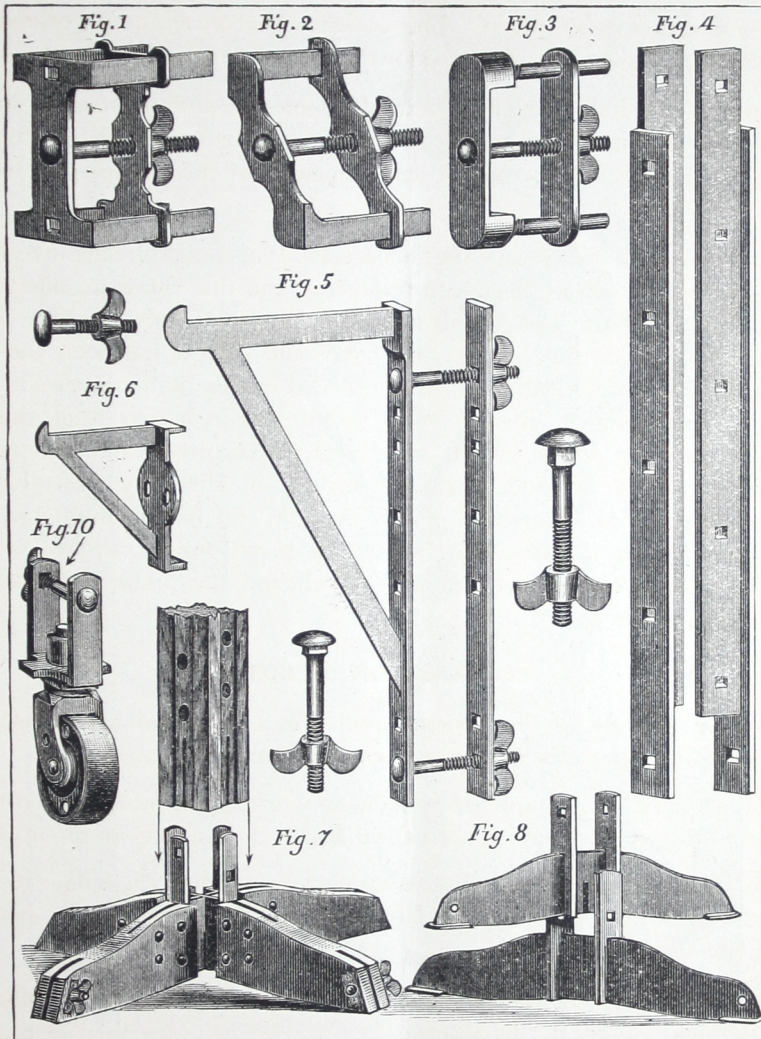
Figure 3.—RIGHT ANGLE TIE, as applied to the external angle of scaffolds when the scaffolds are returned around the building.

Figure 4.—SPlicing IRONS, as applied when the uprights are to be increased in height.

Figure 5.—SUPPORTING BRACKETS, as used in Single Upright Scaffolds, for lining and renovating fronts or gables by painters, bricklayers, etc.

Figure 6.—LEDGER BRACKET, as applied on the side of ledger where one ledger and two uprights can only be used, as may be the case in a narrow passage or hall-way.

Figure 7.—FOOT LOCKS. The uprights being inserted in them (as per cut), the scaffold is firm without the necessity of bracing. Applicable for dwellings, private offices, etc.

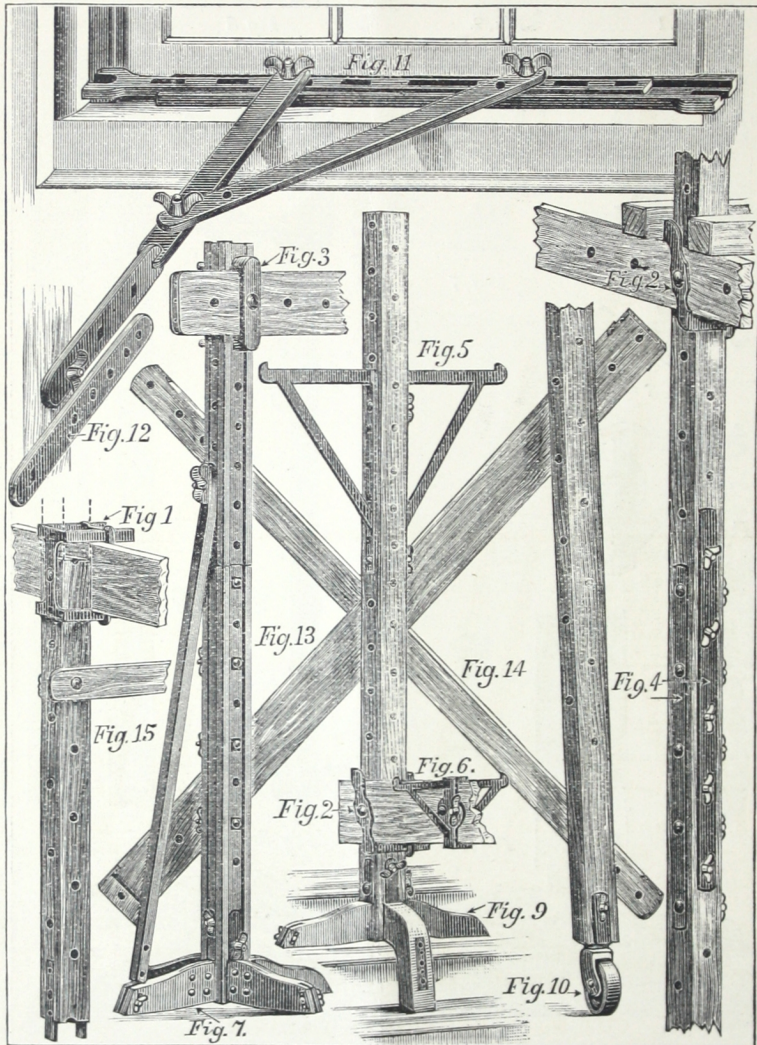


CUT No. 1.—APPLIANCES.

Figure 10.—SHOE WITH CASTOR attached as applied to the feet of the uprights in moveable scaffolds. See Cut No. 1.—Appliances.

Figure 8.—Foot Locks. Showing each part separated to portray the system of locking. It differs from figure 7 by reason of being *entirely of malleable iron* and much lighter. See Cut No. 2.—Appliances as Applied.

Figure 9.—Foot Lock, as applied to stairs. The upright stands as firm on the tread of the steps, as on a level floor. See Cut No. 2.—Appliances as Applied.

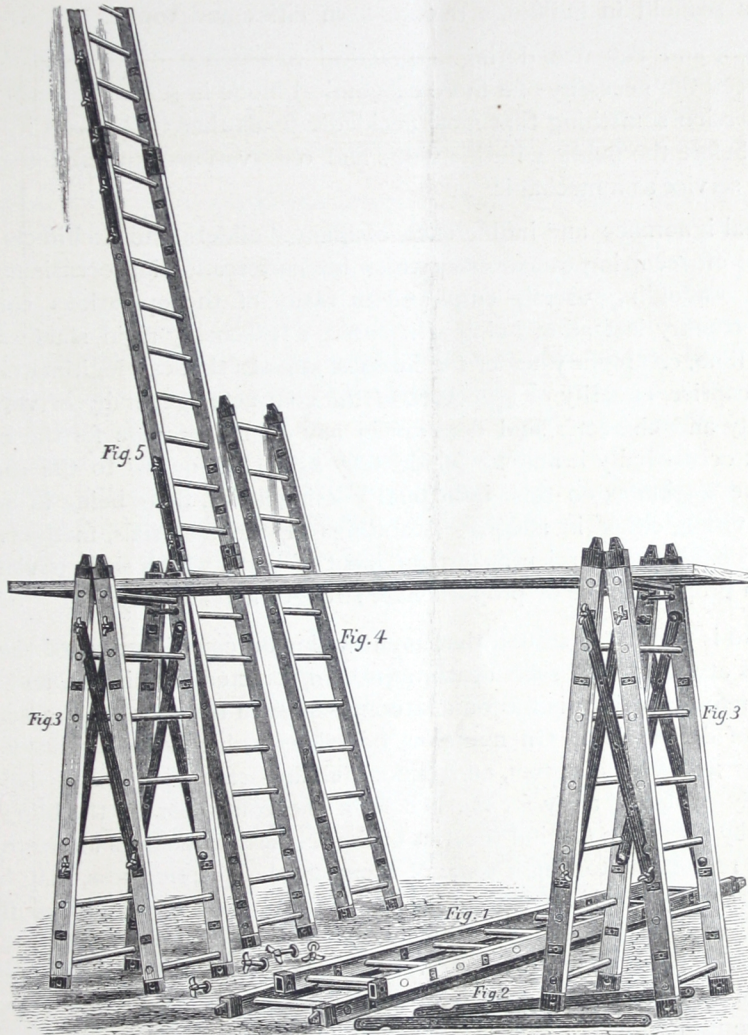


CUT No. 2.—APPLIANCES AS APPLIED.

Figure 11.—WINDOW BRACE, sliding and adjusted to suit any size window frame. The extreme ends straddle the outer rabbet or fillet of frame, the arm as extended outward and connected with the upright by the bolt as shown. No defacing of window sills by nailing.

Figure 12. EXTENSION IRON FOR WINDOW BRACE.

Figure 13.—LEDGER, halved at either end. Which is the supporting beam of the scaffold as used in the interior and exterior of all buildings.



CUT No. 3.—SECTIONAL LADDER.

Figure 14.—THE LATERAL DIAGONAL OR RAKING BRACE.

Figure 15.—LEVEL SECTIONAL REGULATING OR BINDING TIE, to maintain the uniformity or regularity of each section of large interior scaffolds.

CUT No. 3.—SECTIONAL LADDER.—The object is to provide a ready means of uniting

the pieces of a sectional ladder so as to permit the extension of any desired length, and to enable the said pieces to be used in pairs standing alone like an ordinary step-ladder, the uniting and detaching being effected in a rapid manner, and without the use of cumbersome splicing devices such as have heretofore been generally employed. Can be used as a light, temporary scaffold in buildings remote from cities and towns.

The Inventor and Patentee, during a practical experience of 38 years, as a building mechanic, has seen the necessity of a more economical mode in scaffold erecting, and having now in his possession something that most decidedly tends thereto, he feels it incumbent on him to place it before the public with his views and observations, gathered together during long and active service as a mechanic.

The criminal ignorance and indifference of many builders and architects are obvious precursors of the oft-recurring catastrophes which insecure scaffolding occasions. The fact is patent that the scaffolding usually employed in many of the operations connected with building in this country instead of being as it ought, a reasonably rigid, stable structure, not imperilling life, limb, or property under the heaviest stresses that can legitimately be brought on it, is by the caprice, cupidity or ignorance of the contractor generally of very inadequate strength, stability and character, and does not in any degree provide for the extraordinary strains to which occasionally it may be incidentally subjected, owing to the carelessness or willfulness of the workmen, on their individual contingencies, there being in such cases no prospective provision, either in adequate scantlings of the materials, methods of securing fastenings and connections, or scientific arrangement of parts, which shall obviously be sufficient to insure a proper reserve of proportionate strength and stability.

SCAFFOLDING is frequently so frail that even the innate consciousness of the uneducated workman recoils at the idea of such death traps being erected for his use, and occasionally he indignantly refuses to risk his life on a structure of such treacherous character, which is almost certain of destruction. On numerous occasions such scaffolding has been a fruitful source of serious and fatal disasters, and minor building casualties are of daily occurrence which are usually explained away for the benefit of the contractor by the blind speculation of ignorance or by ingenious fanciful theories of the reckless mechanics interested perhaps in covering up the real cause, to which some of them, by their carelessness, may have been in a measure contributory; or if an outrage be perpetrated too flagrant, to be thus frivolously explained away, an attempt is made to palliate the offence, thus public alarm and indignation have been allayed by an exculpatory verdict, mysteriously attributing the mishap to accident, that all shielding device, which in public estimation covers the sin, whereby the guilty parties are unrightously absolved from the criminal responsibility, and deserved public censure.

Notwithstanding that investigation into alleged causes often reveals conflicting fanciful theories of ignorant workmen, not justified by the facts of the case as interpreted by the unerring light of intelligently applied mechanical sciences, no effectual step appears to have yet been taken looking to the amelioration of the imperilling condition of the laws and customs of the various commonwealths in this regard, which as it were, impliedly sanction

this dangerous exposure of innocent workmen, who by force of circumstances must take such work as offers, or starve, two possible fatalities, by allowing them to expose their lives on frail scaffolding without a definite authoritative, protective protest in the form of legislative enactment which shall specifically impose a rigid liability on builders, contractors and architects who use scaffolding defective in materials, method of construction or manner of erection, and shall thus remove the necessity of recourse to costly and uncertain legal technicalities, the difficulty in most cases of procuring direct evidence to sustain the case. The proverbial unreliability of witnesses under severe cross-examination, and the natural reluctance of employees to inculcate their employer by truthful evidence.

As some states have constituted boards of building inspectors of insecure and unsafe buildings or structures in the larger cities, it might be suggested that the powers and remedies invested in them be extended so as to include scaffolding.

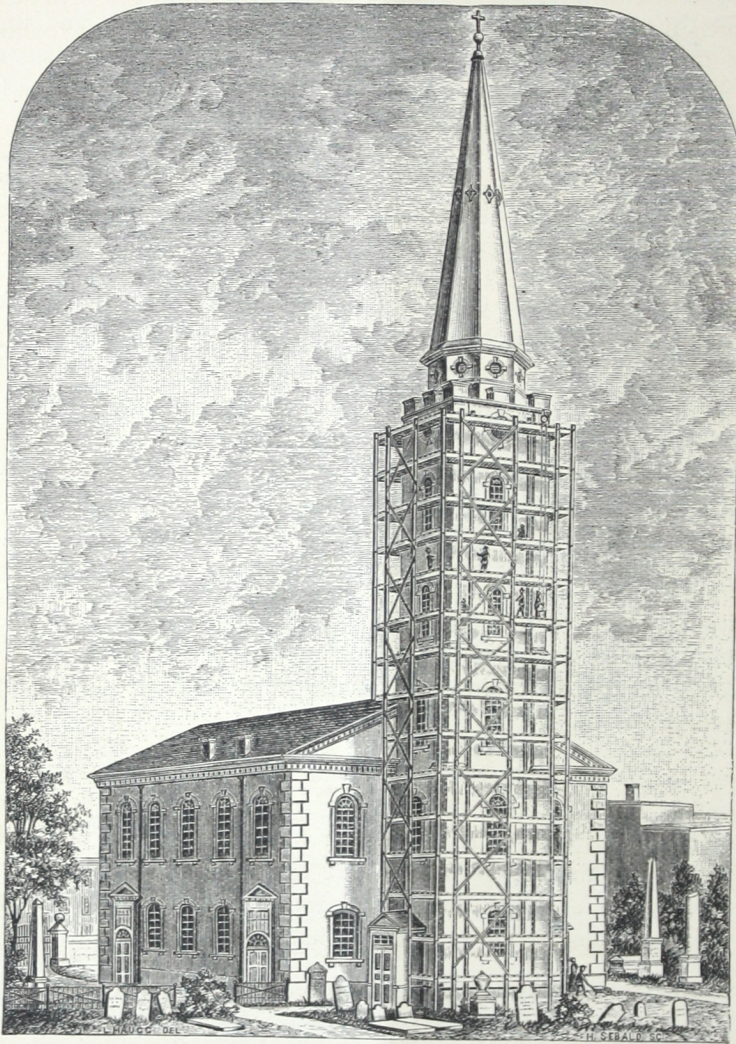
Scaffolding in streets includes, expressed or implied, proper provision for protecting passers-by from falling brick, stone, debris, dust, etc., arising from the building operations. In the large cities of America this protection should be more insisted upon than it is. In England and France it is strictly imperative. In London, and perhaps more generally so in Paris, canvas or baize screens are used, which serve to protect the passers-by from dust, etc., and at the same time to shield the workmen from inclement weather, sometimes the entire building is enclosed, the scaffolding being used as a framework to secure the covering, so that building operations can be carried on in all kinds of weather, and if need be, by night as well as by day, with the aid of the Electric Light.

A peculiarity of scaffolding in France and in England is its erection complete in advance of the prospective building, and the great importance with which the French State Authorities properly regard scaffolding, and indeed all regulations which appertain to the construction of buildings.

In presenting to the building community our PATENT COMBINATION SCAFFOLDS the Patentee is desirous of demonstrating the advantages which he claims it has over the old-time system of erecting scaffolding. It saves the extravagant waste of lumber by dispensing with nailing or cutting off timber which with care can be used for years. It gives entire confidence to the workmen, enabling them to be more expeditious in the performance of their work, and insuring safety to life and limb by its combined strength.

It is a well established fact that in the erection of large scaffolds oftentimes the workmen in their desire to rapidly execute their work, neglect to drive sufficient nails at given points, their attention inadvertantly being drawn from their act of nailing, and not perceiving their error until a sudden crash causes the maiming or loss of life to their fellow workman. In our scaffolds they cannot forget the insertion of the bolts needed to form the connection and make them secure. In framing or putting together the different appliances, the ledgers and standards are firmly bound together, with ties, bolts, braces, etc., and the whole structure is securely bound, allowing of no swagging or vibrating. It is impossible to get

it out of plumb, level, or square, in connecting the sections and framing if the consecutive range of holes as bored in the standard, ledger or braces, have the bolts inserted in their regular range or order. The regularity of heights afforded, as there is no possibility of the tie



CUT No. 4.—CHURCH TOWER SCAFFOLD.

slipping, as in the case with ropes, the whole service portion of platform is uniformly level, there being no unequal heights, to cause the flopping of boards when laid upon the cross-bearers and transom. In churches it permits a continuance of the services. In banks,

insurance, trust and safety deposit companies, public halls, stores and places of amusement, it is no obstruction to business, as the spaces between sections, can be so trussed as to afford ample room for passing to and fro.

CUT No. 4 Shows it as applied to building, repairing, painting, renovating or renewing of CHURCH TOWERS or SPIRES, with perfect safety and convenience, and with at least three quarters less lumber than in the old system of wasting lumber, and as to expense, a saving at the same ratio as the cost of lumber.



CUT No. 5—BLANK GABLE AND FRONT SCAFFOLD FOR LARGE BUILDINGS.

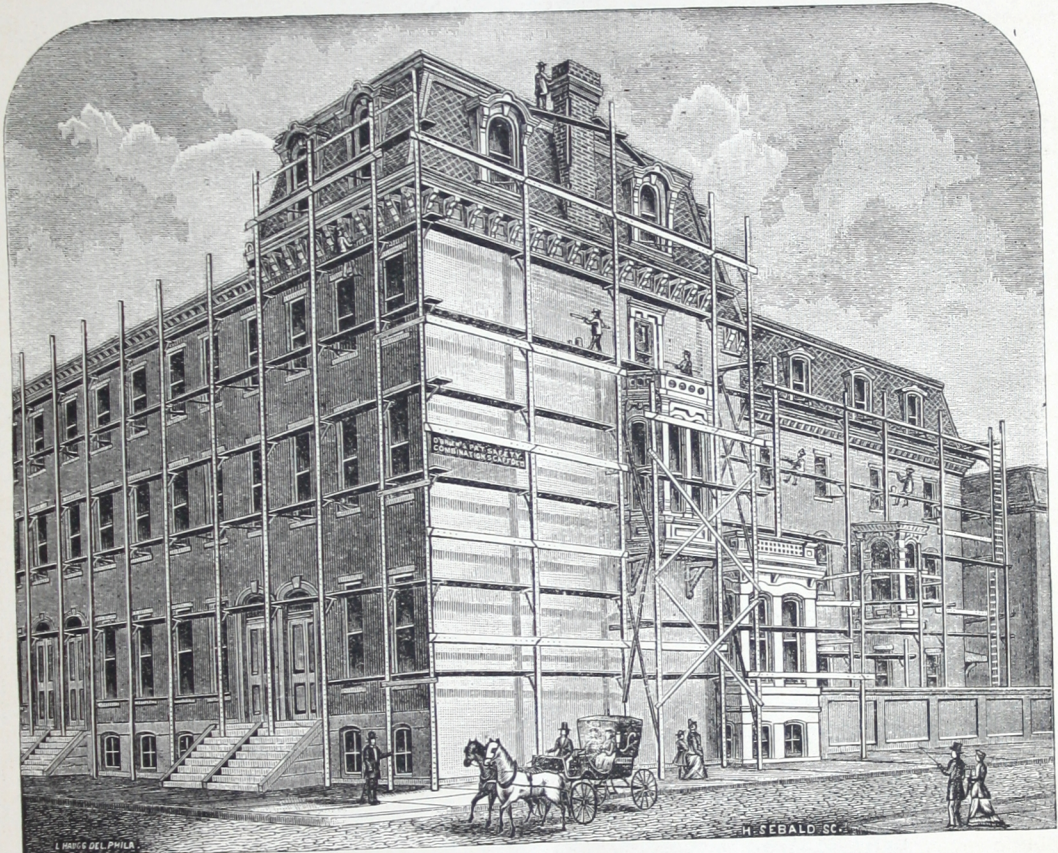
CUT No. 5 shows it as applied to the EXTERIOR OF LARGE BUILDINGS, for the use of Stone Masons, Bricklayers, Iron Workers, Plasterers or any mechanical branch where heavy material may be required in the construction.

The left hand face of CUT No. 5 shows a perfect secure system of A bracing as applied to a blank gable, and the right hand face shows the advantage we claim for our WINDOW BRACE APPLIANCES.

As applied to the use of bricklayers for fronts or gable walls, instead of the old system of building the put-logs in the wall, the outer uprights, or standards, with their ledgers at their proper heights and the standards at their proper distance from the face of the wall (as the magnitude of the building to be erected may require) are generally erected when the brickwork has reached about breast high, the scaffold is then required. In dispensing with the put-logs in the wall, the substitute is this, the outer upright and ledger connections form the necessary scaffold the required height, which are braced longitudinally and transversely (as portrayed in the illustration, Cut No. 5) firmly such a height as the pleasure of the contractor or builder may deem necessary, then the interior uprights 5 feet to 5 feet 6 inches (See Cut No. 2, Fig. 1.) are placed at the proper distance interior and the ledger attached with double tie and bolted through, the transoms or put-logs are then placed across at their regular distance each alternate put-log or transom having the small ledger clamp attachments which not only binds the interior ledger and uprights to the exterior but preserves an equal and perfect uniformity as to width as each tier of scaffold is added. If a front scaffold with windows, the window attachment (as per Cut No. 2, Fig. 11) can be used when the second scaffold is required, the interior 5 feet or 5 feet 6 inches upright is again needed by inserting the same with the iron strap (See Cut No. 2, Fig. 1, the lower end of upright,) attached in the head of the double tie and putting in the bolt necessary to secure the foot of upright, and then adjust the ledgers as before. This system can be continued up to any height with perfect safety, more conveniently, where the window appliances can be used than on blank wall or gable, when the system of A bracing is adopted transversely (See Cut No. 5.)

PAINTERS' SCAFFOLDS (See Cut No. 6), for fronts or side walls of buildings. For painting, lining, or restoring the appearance of the brick or stone-work, our system is so simple and at the same time so secure that the workmen need have no fear. We claim it is more economical than the system of *swinging scaffolds*, for in covering the surface of the wall it enables the workmen to a continuous following up of his work, requiring less labor and a more rapid completion of the work. The workman feels secure and works with more satisfaction knowing he has a solid foundation under him. Not so in the swinging scaffold where the cornice or eaves of the building may be rotted by age, or of frail construction, unable to withstand the strain, or the rope defective, or the iron hangers flawed or of insufficient strength from the action of frost on iron in freezing weather. These probable possibilities are not imaginary, we read of accidents from such causes daily and weekly in the public press.

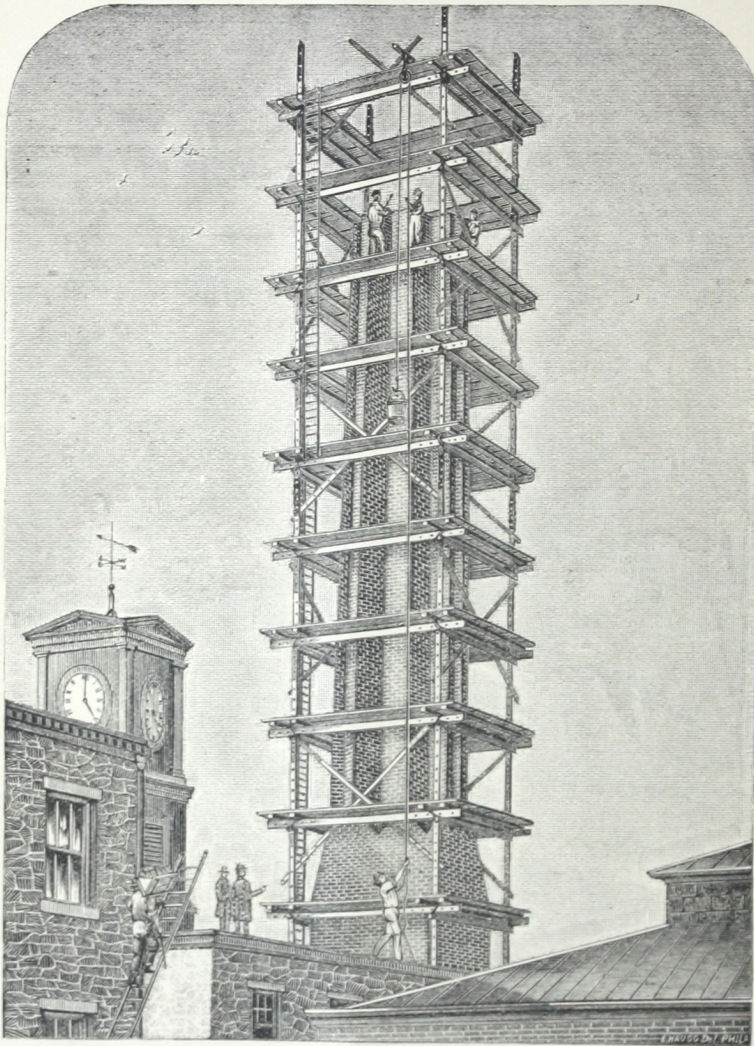
Our WINDOW BRACE INVENTION we claim to be a prevention or provision against the defacing of the window sills as is the case in the old custom of nailing, which destroys the sill, leaving holes in the wood for absorption of water and the elements to cause decay. We also claim the time saved in having the whole surface covered by a scaffold. No time is wasted in shifting, as in the swinging scaffolds, when each stretch is required to be covered, and the number of times repeated if two or more coats may be required. We claim that on our scaffolds two men can do the work of three, and also three men are equal to five in doing the work that has to be accomplished. *Experience has proved it.*



CUT No. 6.—LIGHT EXTERIOR SCAFFOLD FOR PAINTERS, ETC.

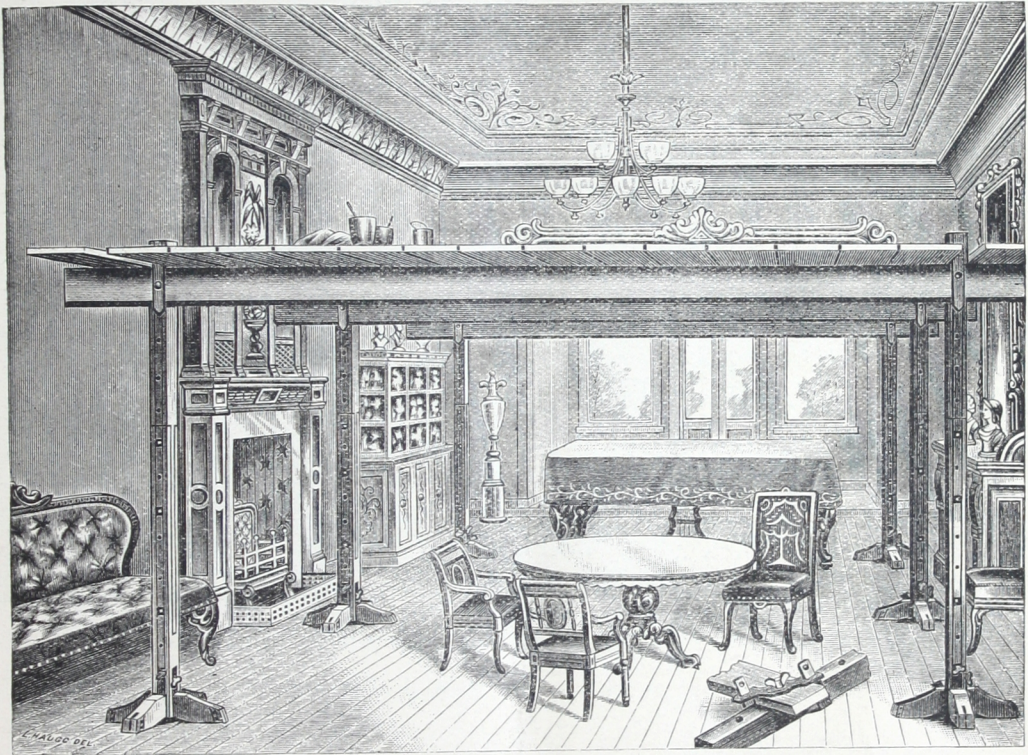
CUT No. 6 shows it as applied to the EXTERIOR OF DWELLINGS, for the use of Painters in lining or renovating brick fronts, no nailing or defacing of window sills, no necessity for encroaching on the privacy of the family, as our Window Attachment obviates any necessity for the raising of the sash.

FOR CLEANING STORE FRONTS, for Carpenters renewing the cornices of buildings, window heads or skinning or refacing fronts. POINTING OF FRONTS AND GABLES by bricklayers.



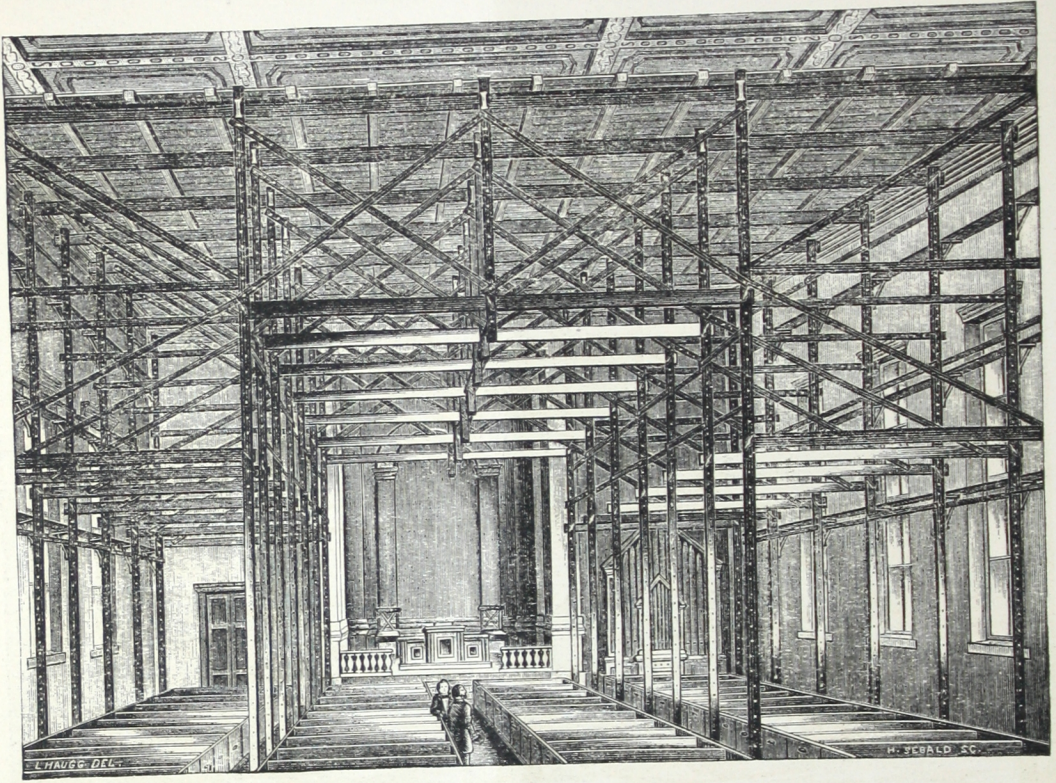
CUT No. 7.—LARGE CHIMNEY STACK SCAFFOLD.

CUT No. 7 shows it as applied to the erection of large CHIMNEY STACKS, strengthening, repairing or pointing of the same by bricklayers, it can be erected to any height with perfect safety, affording perfect freedom for the workmen in the prosecution of their work, at the same time giving them confidence that their lives are not in jeopardy.



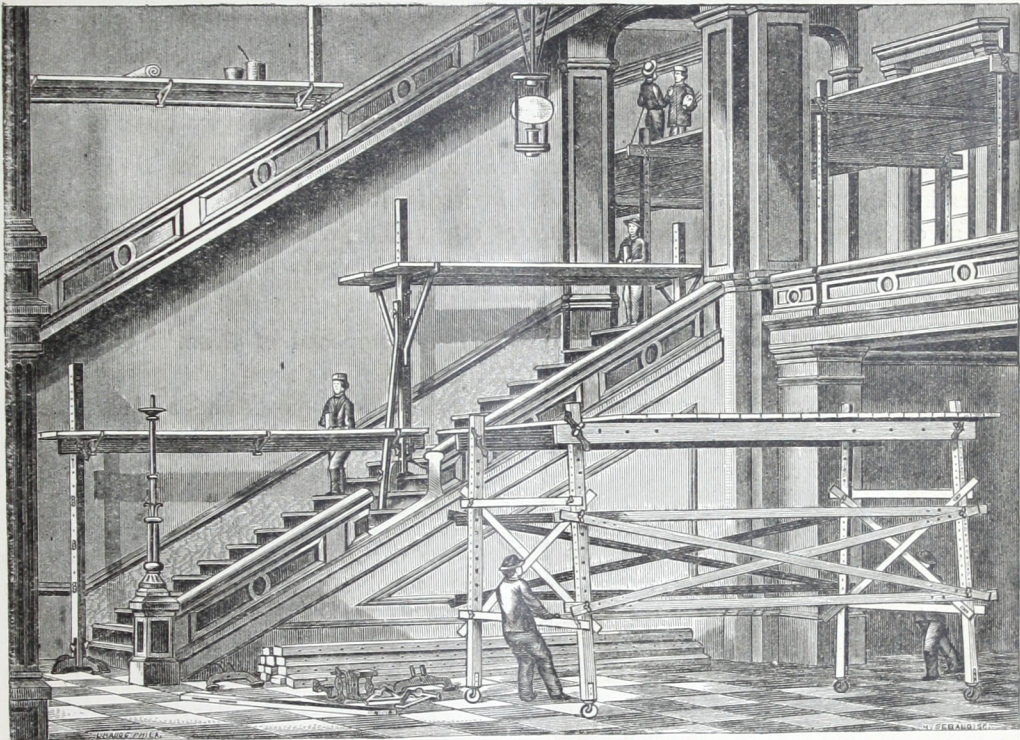
CUT No. 8.—INTERIOR SCAFFOLD FOR DWELLINGS OR PRIVATE OFFICES.

CUT No. 8 shows the arrangement of SCAFFOLDS FOR DWELLINGS as applied for use in Parlors, Dining Rooms, Library, Sitting Rooms, Drawing Rooms, Chambers and Private Offices. No necessity for the removal of furniture from the room, and if necessary the room can be utilized while the work is progressing, more especially in stores. The uprights being behind the counters do not interfere with the transaction of business.



CUT No. 9.—INTERIOR SCAFFOLDS FOR CHURCHES, PUBLIC HALLS, ETC.

CUT No. 9 shows it as applied to the INTERIOR of CHURCHES, without obstructing the aisles or entrance to the pews. It can be so trussed as to permit a clear view for the choir, to see all the movements in the chancel or pulpit front. The uniformity is more pleasing to the eye, and divine service can be conducted without any inconvenience. As to its application to banks there is nothing to obstruct the clerical force in the proper transaction of business. We claim the same advantages when applied to Music Halls, Theatres, Court Houses, or large Public Buildings.



CUT No. 10.—INTERIOR, STAIR-WAY, HALL AND MOVEABLE SCAFFOLDS.

CUT No. 10 shows the SCAFFOLD as arranged in STAIR-WAYS, HALLS AND PASSAGES so as not to interfere with the passing to and fro of the inmates.

The lower right hand corner of Cut No. 10 illustrates the character of the MOVEABLE SCAFFOLDS which can be so arranged in large halls, where the ceiling may be divided in panels, so as not to necessitate the scaffolding of the whole room. The section can be moved or shifted from panel to panel at the option of the workmen.

CHARACTER OF TIMBER.

The UPRIGHTS or STANDARDS are composed of clean, clear and straight white pine, 4 by 4, dressed, ranging alternately from 4 to 30 feet in length. At intervals holes are bored in each transverse direction through the uprights $8\frac{1}{2}$ inches apart, the series upon one side being *staggered*, or alternate with the series at right angles thereto. The foregoing applies to scaffolds used by masons, brick-layers, carpenters, iron-workers, plasterers and painters for interior or exterior of large buildings.

The UPRIGHTS or STANDARDS used in Private Dwellings and Offices, also Scaffolds for Painters, differ from the above. They are longitudinally grooved or rabbeted to receive the bracket, as in cut 5, or erection of scaffolds as per cuts 1 and 2. At intervals holes are bored 4 inches apart in each transverse direction through the uprights, the series upon one side being staggered or alternate with respect to the series at right angles thereto.

LEDGERS are also composed of clean, clear and straight white pine timber, dressed 2 inches in thickness by 7 inches in width, ranging from 4 to 26 feet in length, halved and plated at each end, as shown in Figure 13, at intervals a $\frac{7}{8}$ hole is bored 1 foot apart in a transverse direction. When the space is more than 13 feet holes are bored as the occasion may demand.

LEVEL SECTIONAL REGULATING OR BINDING TIE is composed of clean, clear, white pine timber, dressed 2 inches in thickness by 4 inches in width, as shown in Figure 15, ranging from 4 to 14 feet, holes bored transversely, same as Ledger boards and are used at right angles with the Ledger boards to form square sections as the distance between uprights and standards may require.

Our thanks are due MESSRS. JAMES R. OSGOOD & Co., Publishers of the *American Architect and Building News*, 211 Tremont Street, Boston, for valuable extracts which we have used in this work by their kind permission.

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